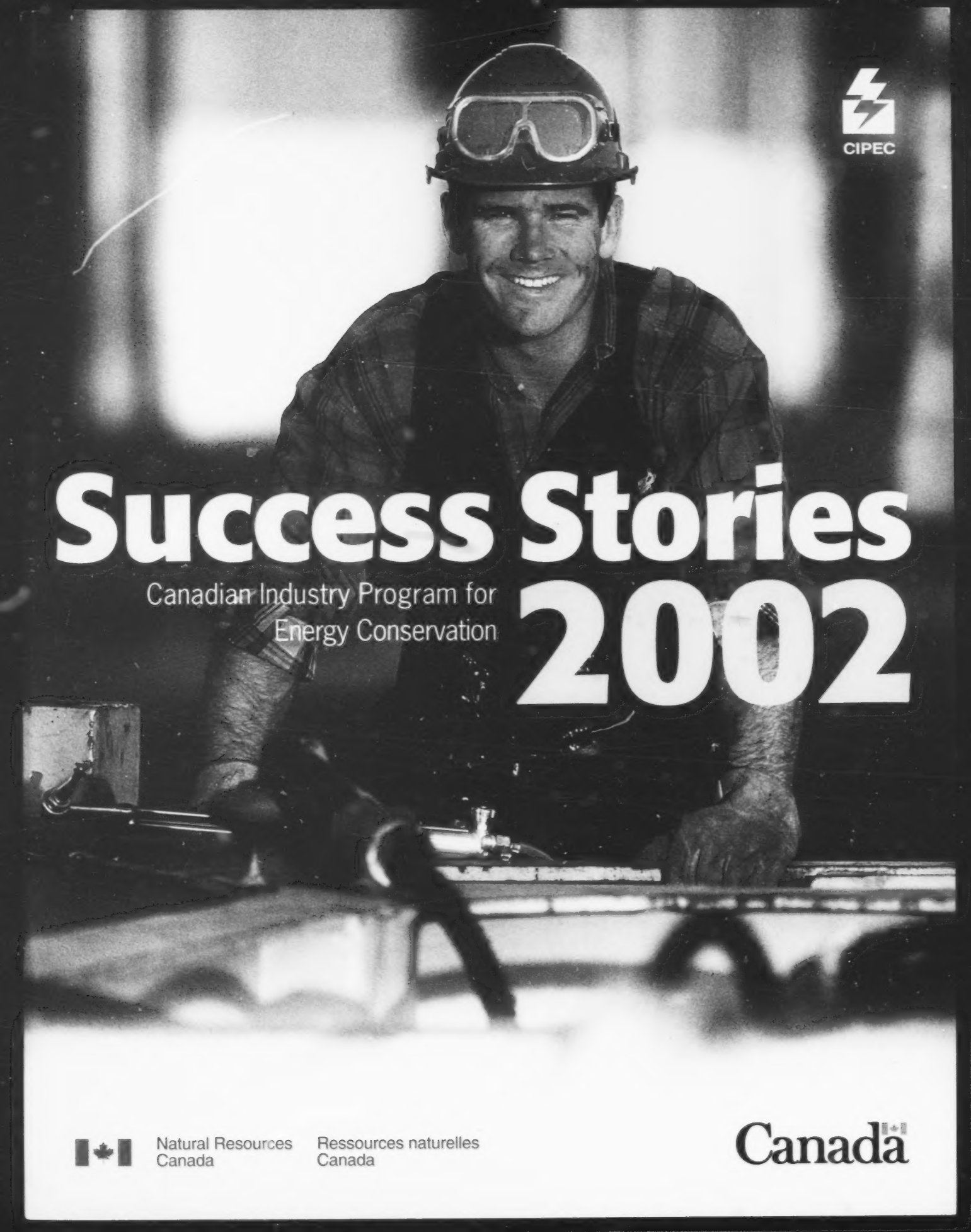


Success Stories 2002

Canadian Industry Program for Energy Conservation

Natural Resources Canada
Ressources naturelles Canada

Canada

104-01679/

Vision and Perspective

The vignettes that follow reveal how a dozen Canadian industrial organizations are working to improve their energy efficiency. They have been selected from among hundreds of success stories in dozens of industries, as Canada's industrial organizations join in a voluntary nationwide effort to reduce the environmental impact of their activities.

Although they share a common goal, each company is driven by its own unique vision and a singular perspective on how best to achieve the results it seeks. Each has found a better way to manage the use of energy in a way that reduces greenhouse gas (GHG) emissions in harmony with Canada's efforts to meet its international climate change goals.

These organizations are among 5000 companies represented by 43 trade and business associations that participate in 25 task forces operating under the CIPEC umbrella. Associations aligned with CIPEC represent more than 95 percent of secondary industrial energy demand in Canada and provide leadership in the continuing march toward improved energy intensity. The successes of the featured companies – and the countless others with similar stories to tell – are living proof that the voluntary approach embodied in CIPEC not only works to improve energy efficiency, it excels!

Although motivated to improve their environmental performance, the companies highlighted here share an understanding that what benefits the environment can also work for the bottom line. By seeking to improve energy efficiency through investments in new technology, better operating practices and greater staff participation, these organizations are reducing their operating costs and improving their profitability. They demonstrate, once again, that even when facing economic uncertainty, what is good for the environment is also good for business. We hope that their stories will encourage other organizations to think about how they use energy and provide a model for them to follow.

Douglas E. Speers
President and Chief Executive Officer, EMCO Limited
Chair, CIPEC Executive Board

BHP Billiton Diamonds Inc.'s recently formed "Operating Excellence" team at its Ekati Diamond Mine in the Northwest Territories has invigorated the company's energy efficiency efforts. Because all fuel used at the mine must be trucked in, minimizing energy consumption is vital to the mine's economic viability.

Operating Excellence

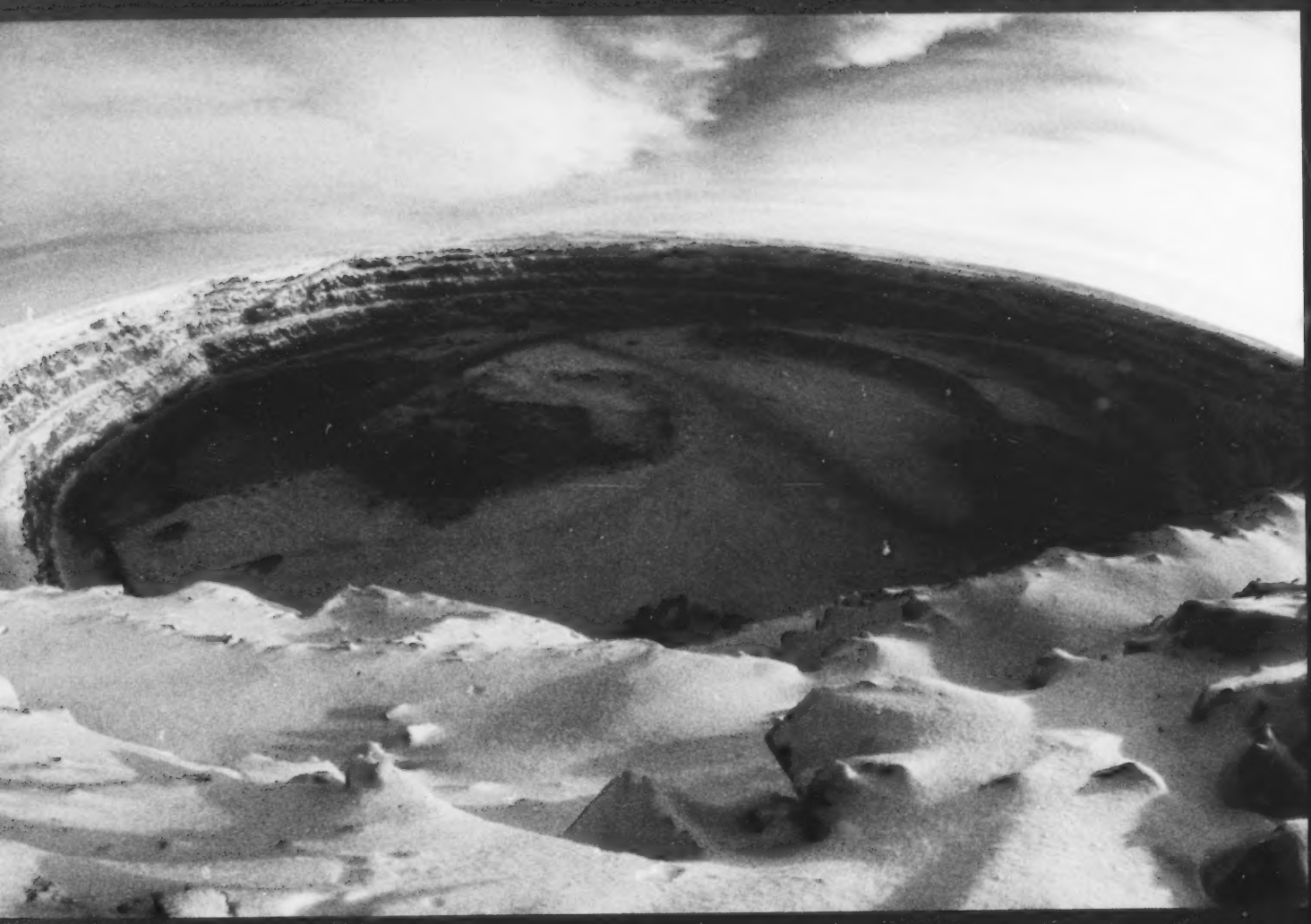
at Northwest Territories diamond mine

Although the mine is energy efficient by design and the company has an eight-year record of investing in energy savings, Operating Excellence has taken earlier efforts to a new level by instilling a relentless commitment to seizing every available opportunity to reduce waste.

The Operating Excellence team, formed in April 2002, is made up of a small group of passionate volunteers from a number of departments. Their goal is to save 500 000 litres of fuel per year – about 6 percent of the mine's annual consumption. Seeking to build an energy-saving culture within the company, the team introduced a suggestion program that garnered overwhelming response. Reinforced by an energy awareness program that includes prizes and recognition, the mine began installing motion-sensor lighting and educating staff to turn out lights in unoccupied areas. Thanks to the suggestions it received as well as its own ideas, within three weeks of its launch, the Operating Excellence team cut fuel usage by an impressive 88 000 litres per year.

Operating Excellence continues to look at all corners of the mine's operations for additional energy savings. For example, the team is investigating the possibility of replacing diesel fuel with used oil in its waste incinerators, potentially saving as much as 475 000 litres of fuel per year. With a great deal of energy needed to pump potable water at the mine, the team is also looking at cutting electricity consumption by improving the efficiency of water-handling equipment, including devices as small as toilets and sinks.

Photo courtesy of BHP Billiton Diamonds Inc.



With its annual eight-week window of opportunity to haul 90 million litres of fuel oil northward on a winter road that is open only from late January to late March, BHP Billiton Diamonds Inc. is concerned more with fuel savings than dollar savings.

Like most of The Clorox Company of Canada, Ltd.'s manufacturing operations, the Glad Division plant in Orangeville, Ontario, has been actively seeking ways to improve its energy efficiency.

Community action

preserves an efficient transportation option

In recent years, the plant has installed high-efficiency lighting systems and motion-sensor-activated lights, wrapped its extruder manifolds with insulating blankets and retrofitted its switch gears with capacitors – all in aid of conserving energy. However, it is the company's participation in the preservation and operation of a railway line that has attracted the most attention.

Spearheading a consortium of six local companies, Clorox played a vital role in acquiring the mothballed 55-kilometre Canadian Pacific Railway line between Orangeville and Streetsville, Ontario, and creating a company to operate it. The consortium, called the Orangeville-Brampton Rail Access Group (OBRAG), convinced provincial, county and local governments to purchase the line and took on responsibility for maintenance, capital improvement and administration. OBRAG hired Cando Contracting Ltd., a specialist in running short-haul railways, to operate the rolling stock.

Beginning operations in November 2000, the rail line now provides a vital link between local manufacturers and their supply chains, carrying about 500 freight-car loads of raw materials to Orangeville each year. Although the driving force behind the preservation of the rail line was an economic one, OBRAG estimates that its trains save a significant amount of fossil fuel consumption by replacing about 1400 annual truck trips from the Greater Toronto Area over local roads. Supplanting these stop-and-go truck trips with a non-stop train route is definitely a step in the right direction for air quality and reduced GHG emissions.

The "Pride of Orangeville" hauls raw materials twice weekly to seven manufacturers in Ontario. Five are in Orangeville, including the Glad Division plant, and two are in Brampton.

The environmental principles under which General Motors of Canada Limited (GMCL) operates demonstrate the company's resolve to "reach further than compliance with the law to encompass the integration of sound environmental practices into our business decisions."

Persistence

pays off in energy savings for General Motors of Canada Limited

The company's persistence in fulfilling this mandate has led to impressive results in many areas, including GHG emissions reductions. Over the last decade, a far-reaching program of initiatives launched by GMCL has reduced its company-wide GHG emissions by 37 percent since 1990, in the process reducing its energy use by 479 million kWh. Energy efficiency efforts undertaken by the company at its vehicle assembly plants have reduced energy consumption per vehicle produced from 3.43 MWh in 1990 to 2.44 MWh in 2000, a decrease of 30 percent. Over the same period, GMCL realized a similar per-vehicle reduction in GHGs, from 0.652 tonnes of carbon dioxide equivalent (CO_2e) in 1990 to 0.458 tonnes in 2000.

GMCL has achieved these results through a rationalization of production and by investing in energy-efficient equipment and manufacturing processes. The company also actively informs employees and suppliers and motivates them to commit to energy efficiency in their operations. In addition, GMCL participates in such organizations as the Coalition for Environmentally Responsible Economies (CERES), which brings together environmental, investor and advocacy groups to focus on creating sustainable and socially responsible practices. GMCL is working toward an aggressive new environmental target – a 25 percent reduction in energy usage with a baseline year of 1995 by the year 2005. This would result in a projected CO_2 reduction of about 45 percent compared with a 1990 baseline.

A non-production load improvement project at General Motors of Canada Limited's site in Oshawa, Ontario, has resulted in annual energy savings of more than 2.5 million kWh.

Fuelled by natural gas, the fluosolids dryer at IMC Potash Colonsay operates around the clock, 330 days a year. Drying fluosolids is an energy intensive activity, and any improvements in the process are likely to pay significant dividends in reduced energy costs at this potash mill in Colonsay, Saskatchewan.

Innovation

enables potash producer to cut process fuel consumption

The company established a project team to evaluate energy consumption in the dryer, identify the most promising possibilities for process improvement and implement these solutions. The team found that gaining better control of airflow in the dryer's windbox (thereby holding temperatures at optimum levels) offered major opportunities for a reduction in energy consumption. However, lacking adequate airflow data that would enable it to identify optimum variables for the complex equipment, the team was forced to improvise using "design of experiment" techniques. Getting it right was critical, as any mistakes would show up as a deterioration in product quality.

Using a variety of systems, technologies, practices and programs, the project team developed a solution that works for various production levels. The mill's digital control system was modified with an algorithm that mimics the response of a control operator to process changes, instantly adjusting airflow to maintain optimum drying temperatures. The project's results speak for themselves – by improving dryer fuel efficiency by 11 percent, the mill has reduced annual natural gas consumption at the Colonsay site by 1.4 million m^3 and cut electricity use by reducing the workload on windbox fans. The company estimates that the $10,000 project will save the mill $490,000 per year, results that can be tripled by duplicating the solution at two other company mills.

By reducing the natural gas consumption of its fluosolids dryer, IMC Potash Colonsay has greatly improved the mill's granular productivity while reducing its unit cost of production.

As part of a worldwide family of quality-oriented companies, Michelin North America (Canada) Inc. is committed to a simple energy management goal: to manufacture more product with less energy.

Sharing best practices

across North America drives results for Michelin

Making this happen has led the company to work closely with Michelin operations in the United States, establish and share best practices, and develop an ongoing energy training program for employees in its three tire plants in Nova Scotia. It has also provided the impetus to upgrade technology and implement practices for operations and maintenance that are more energy efficient.

Michelin has appointed an energy champion at each plant who works to ensure that energy efficiency considerations are integrated into the decision-making process and incorporated into the plant's working culture. Within its plants, power monitoring systems identify areas of prime electricity usage – the first step in developing ways to improve electrical efficiency. Ongoing audits of steam and compressed-air handling systems enable plants to identify areas that need improvement and to implement maintenance procedures that ensure that steam and air leaks are located and repaired immediately.

Investments in new technology are also yielding results. The company installed variable speed drives on four major handling units in one of its plants (an investment that paid for itself in less than one year through energy savings) and upgraded lighting to more efficient T-8 fluorescent technology. Thanks to concerted efforts to upgrade energy efficiency, Michelin's energy intensity trends have shown a strong improvement. Depending on the product line, the company's Canadian plants have reduced the energy consumed per kilogram of production by between 10 and 25 percent since 1992.

Michelin North America (Canada) Inc. has improved the energy efficiency of its systems for refrigeration, compressed air, motor drives and HVAC at its three facilities in Nova Scotia.

When Nestlé Canada Inc. asked its factories to commit to a 5 percent reduction in energy use for the year 2000, Midwest Food Products Inc.'s plant in Carberry, Manitoba, responded.

Exceeding targets

drives energy efficiency at Nestlé subsidiary

The producer of frozen and dehydrated potato products took a hard look at its processes and identified a number of areas where energy usage performance could be improved. For example, the plant decided to upgrade its electrical system and retrofit its line dryers to improve energy efficiency. Midwest Food Products also installed more efficient automatic pressure-venting equipment on its steam system as part of a program to minimize vented steam, thereby reducing energy waste.

The results of these and the plant's other energy initiatives are impressive. These initiatives represent a reduction in energy costs of more than $900,000 in 1999 and $400,000 in 2000 for the Carberry plant. As a result of its aggressive actions to reduce wasted energy, between 1997 and 2000 Midwest Food Products slashed CO_2 emissions that result from the consumption of fuels in its processing plant by about 10 000 tonnes per year, making a significant contribution to Canada's GHG-reduction initiatives.

Nestlé Canada Inc. is also concerned about the environmental impacts of its factories, and in 2000 the head office undertook a company-wide water-usage reduction program with an identified target of a 5 percent reduction per year. Midwest Food Products has exceeded this target by reducing its water usage by 15 percent in one year.

The factories of Nestlé Canada Inc., which include Midwest Food Products Inc., support economically sound industry initiatives that are designed to voluntarily assist the Government of Canada in meeting its goal of reducing greenhouse gas emissions.

Finding simple, low-cost opportunities to capture waste energy is leading to significant GHG reductions for petroleum and natural gas producer Nexen Inc.

Imagination

yields big GHG reductions for oil producer Nexen Inc.

Over the past five years, Nexen has employed this strategy to achieve significant energy waste reductions in its heavy oil operations.

As part of its road map to GHG reduction, Nexen installed portable vent gas compressors and gathering systems at various locations throughout its operations to capture previously vented natural gas, thereby conserving 5.8 million standard cubic feet per day (mmscfpd) of methane and reducing GHG emissions by the equivalent of more than 700 kilotonnes of CO_2 per year. At its facility in Luseland, Saskatchewan, the company now uses captured gas to fuel production equipment, saving the equivalent of 1 mmscfpd in energy consumption and reducing emissions by 150 000 tonnes of CO_2e per year.

With its road map to reduced GHGs also pointing the way to an improved bottom line, Nexen is studying other profitable opportunities to save waste energy. The company is exploring the capture and compression of casing gas for injection into its gas wells, providing an energy reserve for future use as vent rates decline and energy demand increases. Nexen is also looking at the use of casing gas collected in the field for processing and sale to generate power for use in the oil field or to fuel its nearby processing facilities. Whichever road it follows, the company is certain that the imagination and dedication of its operations staff can overcome any detours or roadblocks along the way.

Nexen Inc.'s facility in Luseland, Saskatchewan, and its other heavy-oil operating areas have shown impressive results through methane vent reductions. Nexen is challenging other producers to find similar benefits in other oil and gas operations.

Ontario Power Generation Inc. (OPG) is serious about improving energy efficiency and reducing GHG emissions. In recent years, the company has incorporated these twin objectives into its management systems, launched a series of major energy-saving activities and joined with other organizations to further a proactive environmental agenda.

Partnerships work!

Ontario Power Generation program recognized as North American leader

OPG's actions are part of a comprehensive initiative called "Energy Efficiency @ Work," an award-winning program that combines employee education, cooperative action, energy-related investment and the search for alternative "green" sources of electrical energy.

The Energy Efficiency @ Work program has yielded dramatic results. Since 1994, the company has undertaken more than 300 thermal/conversion efficiency and electrical efficiency projects, leading to energy savings of 2000 GWh per year, annual cost savings of $90 million and yearly GHG emissions reductions of 2.7 million tonnes. The company's energy savings under the program are equivalent to the energy consumed by a city of 80 000 people every year.

Networking and sharing information and advice helped to make the Energy Efficiency @ Work program a success. The program is a result of many contributions and special partnerships that OPG developed with the Canadian Energy Efficiency Alliance, Natural Resources Canada's Office of Energy Efficiency and support from the Alliance to Save Energy and Consortium for Energy Efficiency. Together, these organizations have demonstrated that energy efficiency makes sense and can be accelerated through partnerships.

Committed to cooperative action on climate change, OPG's Energy Efficiency @ Work program was the first Canadian endeavour to win the prestigious Climate Protection Award presented by the U.S. Environmental Protection Agency. These achievements amply demonstrate OPG's commitment to maintaining its triple bottom line of economic performance coupled with environmental stewardship and social equity.

Ontario Power Generation Inc., in partnership with Enbridge Gas Distribution Inc., EnerSys Analytics Inc., Internorth Construction Ltd. and NRCan's Commercial Building Incentive Program, achieved a 30 percent energy improvement over Canada's *Model National Energy Code for Buildings* for OPG's 777 Brock Road Building in Pickering, Ontario. More information is available at the Web site at http://www.energy-efficiency.com.

An energy audit at Schneider Foods' plant in Kitchener, Ontario, has uncovered major opportunities for energy and cost savings.

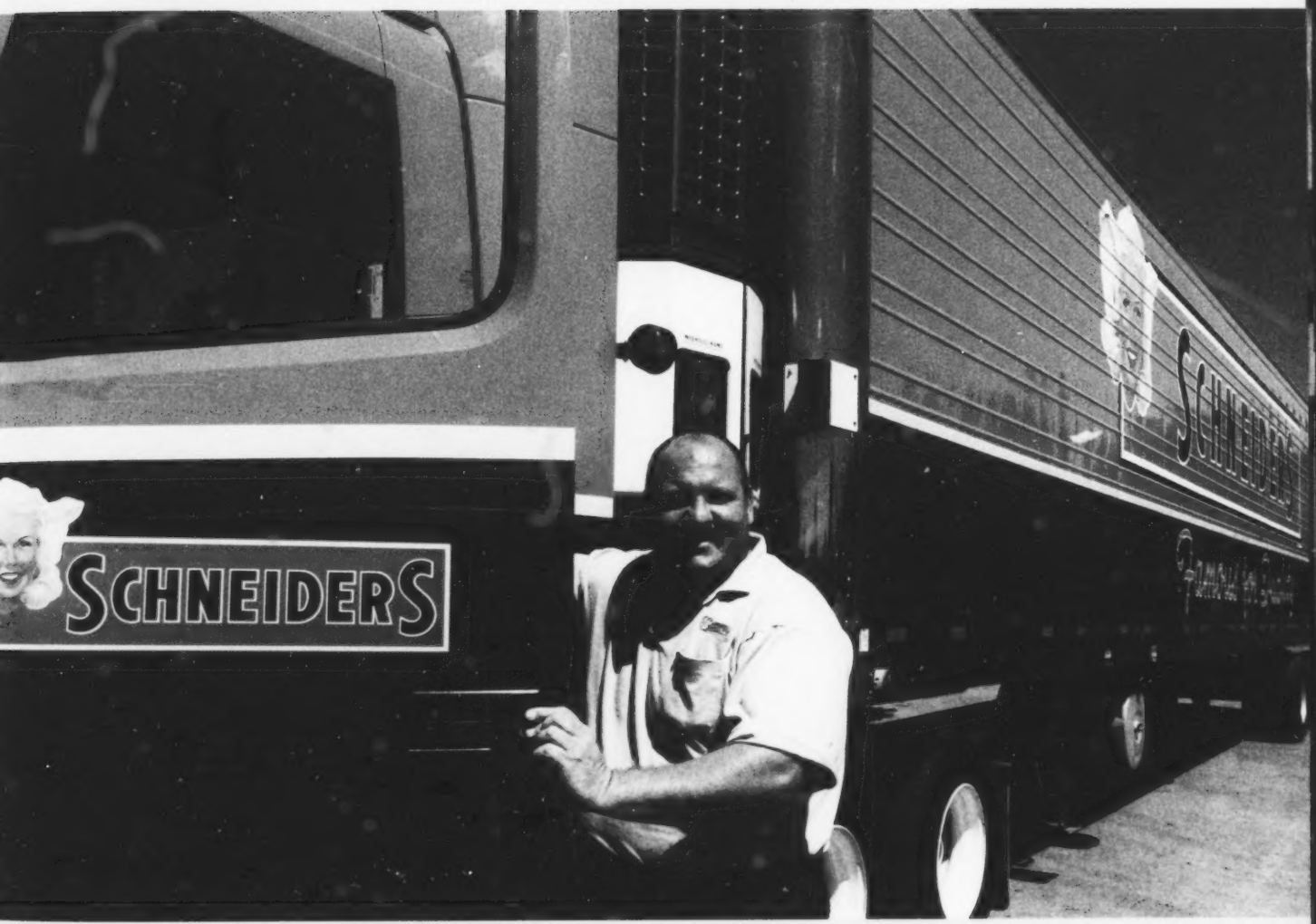
Incentives

drive productive energy audits at Schneider Foods

The audit, conducted with the help of the Government of Canada's Industrial Energy Audit Incentive, focussed on the company's steam and refrigeration systems and on opportunities for energy cogeneration. By taking a thorough look at Schneider Foods' facility, equipment and operating systems, the audit uncovered hundreds of thousands of dollars in potential savings – savings that are also possible at other Schneider plants.

For example, modifications to the boiler plant feeding the plant's steam systems could save $145,000 in yearly natural gas expenditures, and reductions in the main plant's ventilation rate can save another $125,000. Together, these measures would reduce the plant's natural gas consumption by about 20 percent, with a payback on investment of less than one year. Improvements to refrigeration and ventilation systems could reduce electricity use by 15 percent and produce savings of $465,000 per year. Several of the measures recommended by the audit, such as reductions in steam pressures and in the ammonia cooling process, can be implemented at no cost, thereby producing instant savings with no impact on temperatures or product quality.

The audit identified cogeneration as one of the most promising energy-saving opportunities for Schneider Foods. The plant's electrical and steam usage profile is ideal for on-site power generation, and an investment of $6 million to install a natural-gas-powered generating system should net the company about $1.5 million in annual energy savings.



Schneider Foods recognized several opportunities to modify current operating methods and system settings at its power plant that will reduce energy consumption without affecting production.

Compared with most plants in the Stelco family, the Stelfil Ltée facility in Lachine, Quebec, is small. But small manufacturing plants that focus on energy efficiency can have a big impact.

Conversion

from propane to natural gas yields environmental benefits for Stelfil Ltée

Since 1991, by diligently looking at equipment, maintenance and operating practices for ways to improve efficiency, Stelfil achieved a 30 percent reduction in energy consumption.

The plant left no stone unturned. For example, the steel wire producer recognized an opportunity to reduce its GHG emissions by converting its heavily used fleet of lift trucks to natural gas. Stelfil installed two 3600-psi natural gas compressors and refitted its 24 lift trucks to handle the new fuel. The results have been outstanding – not only was the annual consumption of 240 000 litres of propane replaced by 145 000 m^3 of less expensive natural gas, but the cleaner-burning fuel saved an additional 225 000 m^3 of natural gas each year by reducing ventilation requirements. In total, Stelfil's lift truck program reduced the plant's GHG emissions by 489 tonnes of CO_2.

And there were other benefits. Employee safety improved because using natural gas substantially reduced carbon monoxide emissions within the plant, the danger of explosion was minimized and back injuries resulting from cylinder replacements were eliminated. Moreover, lift truck engine maintenance costs were cut, refuelling time was halved and energy costs were slashed by more than $100,000 per year.

Stelfil Ltée's employee awareness programs and its continued search for new technologies will allow it to further reduce its energy consumption in the coming years.

St. Lawrence Cement Inc. reduces the energy component of its cement products by substituting supplementary cementitious materials (SCMs) for Portland cement and recovering energy from selected waste materials.

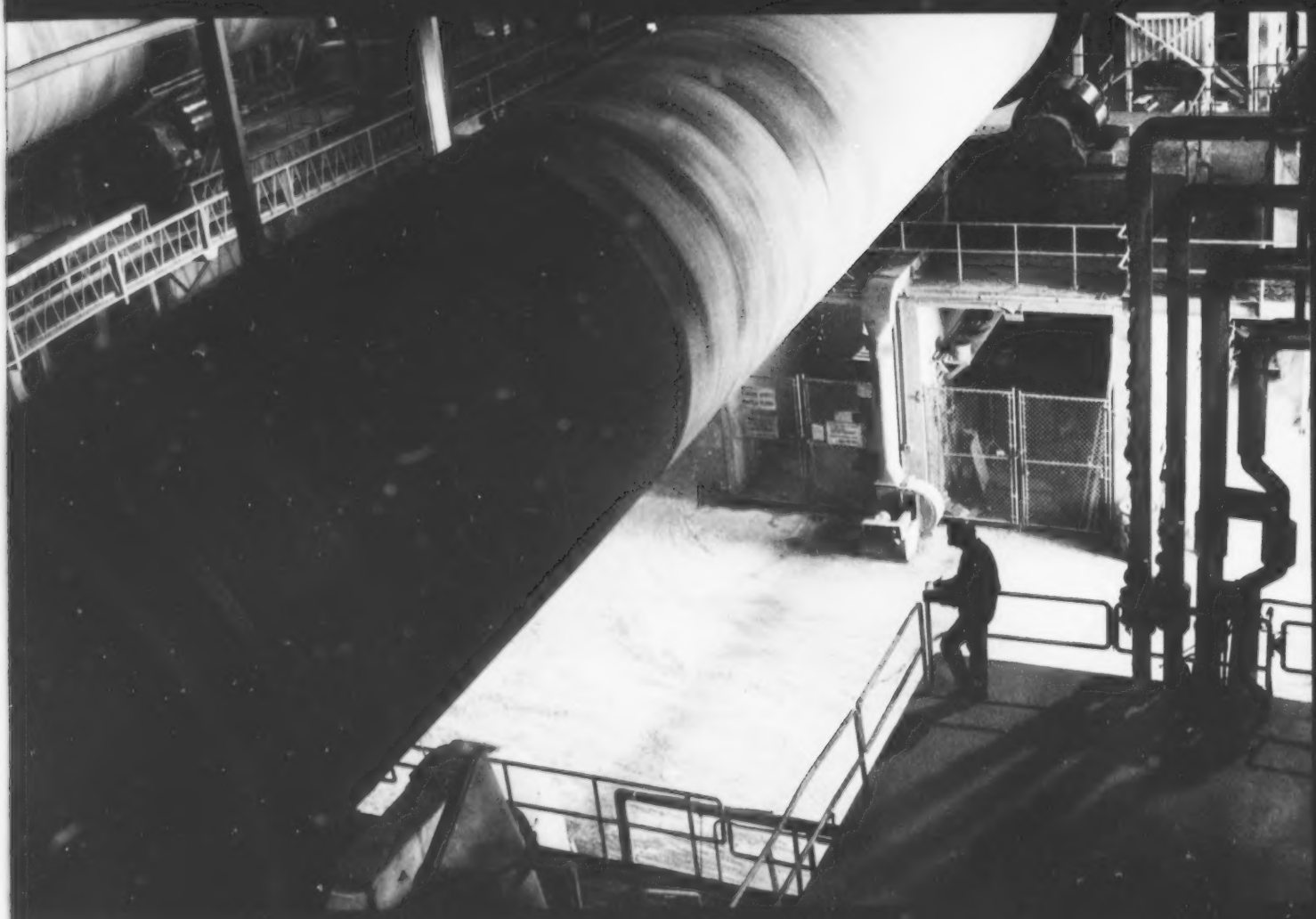
Substitution

with waste materials a key to energy-efficient cement production

The company is a joint owner – with St. Marys Cement – of Great Lakes Slag, which granulates blast furnace slag, a by-product of steel making. St. Lawrence Cement grinds the granulated slag at its plant in Mississauga, Ontario, to produce GranCem®, an SCM that can reduce the use of energy-intensive Portland cement in the production of concrete. Ready mix companies blend GranCem® with Portland cement to make concrete for the construction of foundations and highways. The appropriate use of GranCem® indeed brings improved performance in mechanical properties and durability to concrete.

GranCem®, which is used in a mixture with cement in a ratio of 1 to 3 or 1 to 4, consumes about 25 percent of the energy needed to manufacture the Portland cement that it replaces. By investing in GranCem® production, St. Lawrence Cement is able to accommodate much of its market growth without corresponding increases in energy consumption.

St. Lawrence Cement is also using waste materials to substitute part of the energy component in cement. The company has installed a $6 million granular fuel system at its facility in Joliette, Quebec, that will allow the plant to burn waste material such as sawdust, tire fluff, rubber chips and dried sewage sludge in two of its four kilns. The new system will enable the company to offset the burning of about 42 000 tonnes of coal and coke fuel per year by co-processing waste material that would otherwise have been landfilled or disposed of in a less beneficial manner.



Cement manufacturing is highly energy intensive. St. Lawrence Cement has concentrated significant efforts on improving energy efficiency in recent decades.

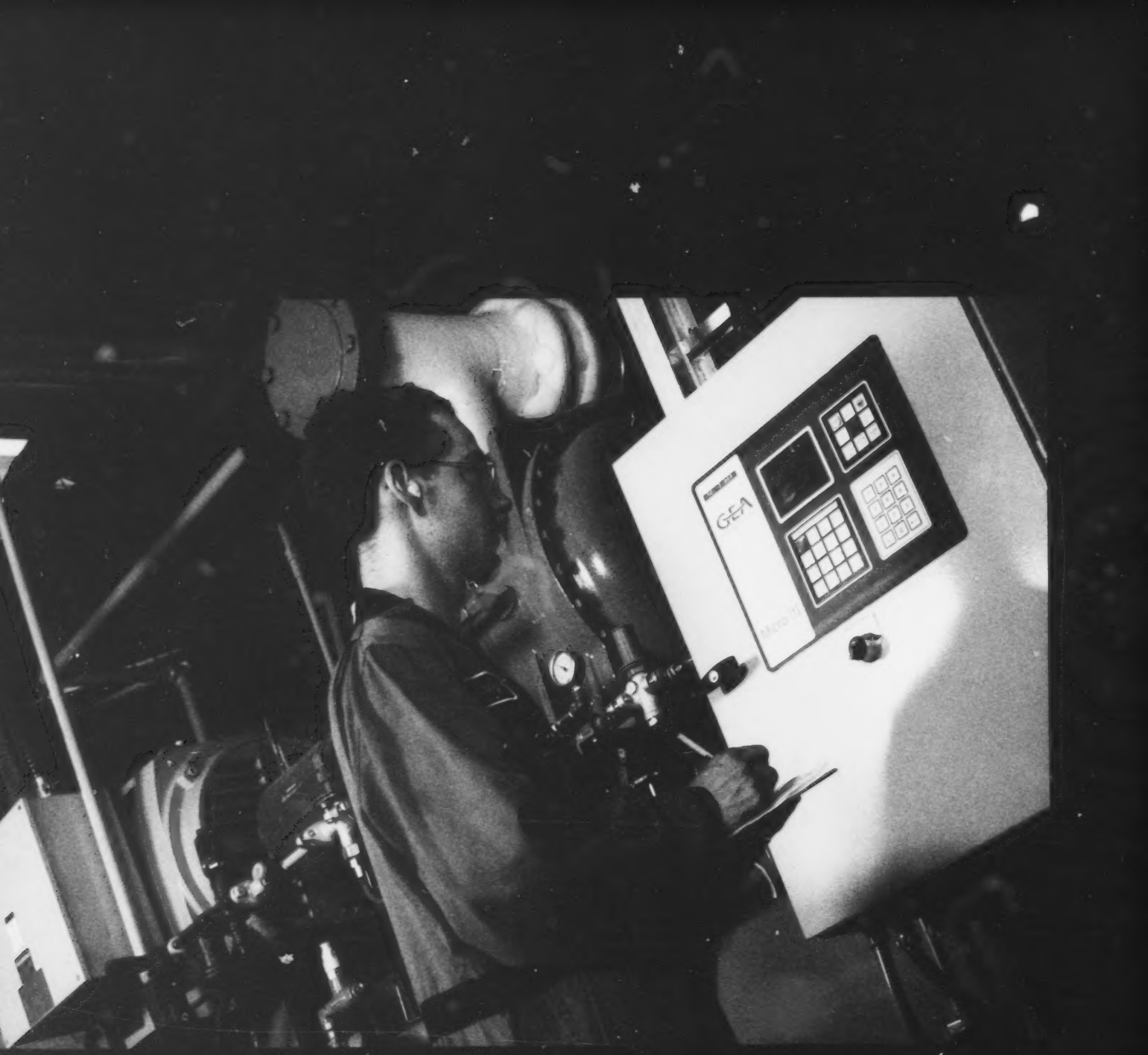
Thanks in part to its active involvement in workshops conducted by Natural Resources Canada's Office of Energy Efficiency under the CIPEC banner, Versacold Group has made outstanding progress toward improved energy efficiency.

Participation

in "Dollars to $ense" workshops pays off for Versacold Group

Across the company, Versacold facilities reduced energy costs in 2001 despite rapid increases in natural gas prices, the inclusion of an additional site in the company's calculations and a doubling of electricity prices in Alberta due to deregulation. Compared with its energy use in 2000, the company decreased its use of electricity by 1.2 million kWh (1 percent) and its use of natural gas by 12 800 GJ (7 percent).

Innovation and cooperation are among the tools Versacold uses locally to further its company-wide energy efficiency goals. For example, at its facility in Lethbridge, Alberta, the company is recovering waste heat from the industrial refrigeration plant and using it to preheat process feed water for Maple Leaf Potatoes, which shares the same building. In 2001, the heat recovery program's first full year of operation, Versacold transferred an average of 1.42 million Btu per hour of waste heat from its cooling facilities to the potato plant's feed water. Over the course of the year, the facility reduced natural gas consumption by 11 percent, saving more than $87,000 in expenditures for natural gas. When electricity savings are added, the $105,000 project paid for itself in less than a year.



Versacold Group rewards the outstanding efforts of its energy managers with its own annual energy efficiency awards. These are presented to each of the company's Pacific, Alberta and Eastern regions. A national award is also given. Two of these awards were presented at Versacold's energy managers' conference in Vancouver, British Columbia, in 2002.

Through Natural Resources Canada's Office of Energy Efficiency, the Industrial Energy Innovators program turns CIPEC commitments into company-level action. This is the fifth edition of CIPEC *Success Stories*. The companies featured here have demonstrated that energy efficiency gains are possible across all industrial sectors in all regions of Canada. Since 1998, CIPEC's *Success Stories* have featured more than 50 companies that embrace energy efficiency innovation and, through their unique vision and perspective, inspire others to advance energy efficiency programs.

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